

## REMARKS

Claims 1-60 are pending in the presented application. In the Office Action mailed on December 1, 2006, the Examiner took the following action: (1) rejected claims 14 and 35 under 35 U.S.C. §112 because they contain the trademark/trade name Antarox BL-240; (2) rejected claims 1-3 under 35 U.S.C. 103(a) as unpatentable over Vaughan (U.S. 3,967,091) in view of Grylls (U.S. 2002/0192496A1) and in further view of Konieczny (U.S. 6,769,956); (3) rejected claims 4-6, 8-10, and 16-17 under 35 U.S.C. 103(a) as being unpatentable over Blohowiak (U.S. 5,869,141) in view of Shimizu (U.S. 4,374,890); (4) rejected claims 7 and 11-13 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu; (5) rejected claim 14 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Hess (U.S. 4,373,968); (6) rejected claim 15 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu, and in further view of Sagiv (U.S. Application 2002/0002243A1) and the Tomadol Data Sheet, "Tomadol", (<http://www.tomah3.com/products/prodImages/TomadolDatasheet.pdf>); (7) rejected claims 18-19 and 61-62 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu, and in further view of Montano (U.S. 6,616,976); (8) rejected claims 20-21 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu and in further view of Tola (U.S. 5,049,232); (9) rejected claim 23 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu, and in further view of Poutasse (U.S. 5,629,098); (10) rejected claims 24-25 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Vaughan, and in further view of Grylls; (11) rejected claims 26-34 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Konieczny; (12) rejected claim 35 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Hess; (13) rejected claim 36 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan, Konieczny, Sagiv, and Tomadol; (14) rejected claims 37-38 under 35 U.S.C. §103(a) as unpatentable over

Blohowiak in view of Grylls, and in further view of Vaughan, Konieczny, and Montano; (15) rejected claim 41 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan, Konieczny, and Shimizu; (16) rejected claim 42 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, Vaughan, Konieczny, Shimizu, and Poutasse; (17) rejected claims 43-44 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Shimizu; (18) rejected claim 45 under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan, Konieczny, and Shimizu. Applicants hereby amend claim 24, cancel claims 1-3, 14-15, 35-36, and 41, and add claims 63-70. Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

*I. Rejections under 35 U.S.C. §112*

Claims 14 and 35 were rejected under 35 U.S.C. §112 because they contain the trademark/trade name Antarox BL-240. Applicants have canceled claims 14 and 35.

*II. Rejections under 35 U.S.C. §103(a)*

Blohowiak (U.S. 5,869,141)

Blohowiak teaches a surface treatment, especially for titanium and aluminum alloys, that forms a sol-gel film covalently bonded on the metal surface to produce strong, durable adhesive bonds between the metal and organic adhesive without using toxic chemicals. (2:62-3:31). This significantly reduces or eliminates the rinse water requirements of traditional anodizing or etching processes. (1:28-45).

Shimizu (U.S. 4,374,890)

Shimizu teaches a method and an adhesive-sheet for the reinforcement of metal plates. (1:7-9). The adhesive-sheet comprises a first epoxy resin composition layer and a second epoxy resin composition layer laminated thereon. (1:66-68; 2:1-10). The first epoxy resin composition layer, when cured by heating, has a modulus of elasticity in tension sufficient to increase the stiffness of the metal plate. (2:25-30).

#### Claims 4-6 and 8-10

Claims 4-6 and 8-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Blohowiak in view of Shimizu. Claims 5-6 and 8-10 depend from claim 4. Applicants traverse the rejections. In particular, applicants respectfully assert that each of the cited references to Blohowiak and Shimizu, whether individually or in combination, does not disclose, teach or fairly suggest every aspect of claim 4. Claim 4 recites:

4. A continuous process for applying a sol-gel coating to a metal material and an adhesive coating onto the sol-gel coating, the process comprising:
  - subjecting the metal material to a caustic solution of sodium hydroxide;
  - rinsing the metal material with water to remove the caustic solution of sodium hydroxide from the metal material;
  - applying a sol-gel coating to the metal material;
  - evaporating the water portion of the sol-gel coating;
  - applying a liquid adhesive coating to the sol-gel coating on the metal material* wherein the liquid adhesive coating is an epoxy-based adhesive coating including:
    - an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and
    - a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotate; and

evaporating the solvent portion of the adhesive coating.  
(emphasis added).

Specifically, Blohowiak does not teach, disclose, or fairly suggest: “applying a liquid adhesive coating to the sol-gel coating on the metal material,” wherein the liquid adhesive includes:

an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and

a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotatate.

This is because Blohowiak only teaches the use of a BMS 5-101 Type II Grade (Dexter-Hysol EA 9628) epoxy adhesive. (6:32-35).

Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of the cited reference to Shimizu. First, Shimizu teaches a process that involves applying a two component epoxy resin *directly* onto a metal plate so that the epoxy resin “comes into contact with the metal plate.” (2:46-50). In contrast, claim 4 recites “applying a liquid adhesive coating to the *sol-gel coating* on the metal material.” (emphasis added).

Second, Shimizu teaches an epoxy resin that includes different composition than the liquid adhesive recited in claim 4. Shimizu teaches an epoxy resin that includes an epoxy that is “derived from bisphenol A and epichlorohydrin.” (3:60-62). This derived epoxy of Shimizu is not a *novolac-epoxy* as recited in claim 4.

A novolac-epoxy is a “phenol formaldehyde resin”, while an epoxy derived from bisphenol A and epichlorohydrin is a “Bisphenol A diglycidyl ether” (BADGE), also known as “Diglycidyl ether of bisphenol-A” (DGEBA). More to the point, novolac-epoxies (phenol formaldehyde resins) are not derived from bisphenol-A and epichlorohydrin, but are commonly derived from phenol and formaldehyde. Accordingly, novolac epoxies have molecular structures that are different from epoxies derived from bisphenol A and epichlorohydrin (BADGE, which is

also known as DEGBA). <http://www.epoxyproducts.com/novolac.html> (Novolac and High Temperature Epoxy Info Page); <http://chemfinder.cambridgesoft.com/>, (Results from searches conducted on the free chemfinder database using “novolac” and “bisphenol A diglycidyl ether”); <http://sunilbhangale.tripod.com/epoxy.html> (Types of epoxy resins). Accordingly, Shimizu cannot disclose, teach or fairly suggest “about 10-30% by wt. *novolac-epoxy*”, as recited in claim 4. (emphasis added).

As a result, not only does the cited reference to Shimizu not teach “applying a liquid adhesive to the *sol-gel coating* on the metal material,” as recited in claim 4, but the dissimilarities between the epoxy resin of Shimizu and the liquid adhesive as recited in claim 4 also goes beyond mere differences in concentration ranges of the respective components.

Therefore, each of the cited references to Blohowiak and Shimizu, whether individually or in combination, does not teach, disclose or fairly suggest the process recited in claim 4. Furthermore, since claims 5-6 and 8-10 depend from claim 4, they are at least allowable for the same reason that makes claim 4 allowable over the cited references, as well as for additional limitations recited in those claims.

#### Claims 7 and 11-13

Claims 7 and 11-13 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu. Claims 7 and 11-13 depend from claim 4. Applicants traverse the rejections. Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 4 under 35 U.S.C. §103(a). Accordingly, applicants respectfully submit that each of the cited reference to Blohowiak and Shimizu, whether individually or in combination, does not disclose, teach or fairly suggest the process recited in claim 4.

Furthermore, because claims 7 and 11-13 depend from claim 4, they are also allowable over the cited references to Blohowiak and Shimizu for at least the same reason claim 4 is allowable, as well as for additional limitations recited in those claims.

#### Claims 16-17

Claims 16-17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Blohowiak in view of Shimizu. Claim 17 depends from claim 16. Claim 16 recites:

16. A continuous process for applying an adhesive coating *onto a sol-gel coating* on a metal material, the process comprising:
  - applying a liquid adhesive coating to the sol-gel coating on the metal material, wherein the liquid adhesive coating is an epoxy-based adhesive coating including an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, *about 10-30% by wt. novolac-epoxy*, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and
  - a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotrate; and
  - evaporating the solvent portion of the adhesive coating. (emphasis added).

Applicants traverse the rejections. Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 4 under 35 U.S.C. §103(a) by analogy. Accordingly, applicants respectfully submit that each of the cited reference to Blohowiak and Shimizu, whether individually or in combination, does not disclose, teach or fairly suggest the process recited in claim 4. Furthermore, because claim 17 depends from claim 16, it is also allowable over the Blohowiak for at least the same reason claim 16 is allowable, as well as for additional limitations recited.

Montano (U.S. 6,616,976)

Montano teaches a process and composition for improving the adhesion between a metal surface and a polymeric material by treating the metal surface with an adhesion promotion composition followed by contacting the treated metal surface with an epoxy resin composition. (5:5-10). The process and composition facilitate the production of circuit boards for electronic devices without concern that the polymeric material may delaminate or peel from the metal surface. (5:20-26).

Claims 18-19 and 61-62

Claims 18-19 and 61-62 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu, and in further view of Montano. Claims 18-19 depend from claim 16, and claims 61-62 depend from claim 4. Applicants traverse the rejections.

Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 4 and claim 16, respectively, under 35 U.S.C. §103(a), and assert that the cited references to Blohowiak and Shimizu do not teach the process recited in claim 4 and 16. Furthermore, the deficiencies of Blohowiak are also not remedied by the teachings of Montano. The cited reference to Montano teaches that an epoxy resin composition can be applied to a metal by spray coating, dip coating, and roller coating. (9:41-46). However, the cited reference to Montano does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in each of the claims 4 and 16. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Shimizu, and Montano) whether individually or in combination, does not disclose, teach the process recited in claim 4 and claim 16, respectively.

Therefore, because claims 61-62 depend from claim 4, and claims 18-19 depend from claim 16, they are also allowable over the cited references to Blohowiak and Shimizu at least due to their dependency, as well as for additional limitations recited in those claims.

Tola (U.S. 5,049,232)

Tola teaches a method of making a plurality of separate pressure transducers of the type comprising a strain gauge circuit bonded to a diaphragm, comprising the steps of providing an array of a plurality of strain gauge circuits formed on a laminated sheet and an array of a plurality of diaphragms corresponding to the array of the strain gauge circuits. (1:29-55).

Claims 20-21

Claims 20-21 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak, in view of Shimizu, and in further view of Tola. Claims 20 and 21 depend from claim 16. Applicants traverse the rejections.

Specifically, applicants respectfully incorporate the argument presented above in response to the rejection of claim 16 under 35 U.S.C. §103(a). Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Tola. The cited reference to Tola teaches a method for forming a foil/dielectric laminate with an adhesive layer of about 0.4 mils. (3:44-48). However, cited reference to Tola does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 16. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Shimizu, and Tola) whether individually or in combination, does not disclose, teach the process recited in claim 16.



Furthermore, since claims 20-21 depend from claim 16, they are at least allowable for the same reason that makes claim 16 allowable over the cited references, as well as for additional limitations recited in those claims.

Poutasse (U.S. 5,629,098)

Poutasse teaches an adhesive composition that facilitates the product of laminates used in making printed circuit boards. (1:9-14). The adhesive composition comprising (1) at least one multifunctional epoxy; (2) the composition derived from at least one difunctional epoxy resin and at least one compound represented by the formula  $R-(G)_n$ . (1:46-50).

Claim 23

Claim 23 is rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Shimizu, and in further view of Poutasse. Claim 23 depend from claim 16.

Applicants respectfully incorporate the argument presented above in response to the rejection of claim 16 under 35 U.S.C. §103(a). Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Poutasse. The cited reference to Poutasse teaches applying an epoxy adhesive containing acetone to a foil to produce a laminate. (4:48-59). However, cited reference to Poutasse does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 16. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Shimizu, and Poutasse) whether individually or in combination, does not disclose, teach the process recited in claim 16. Furthermore, since claim 23 depends from claim 16, it is at least allowable for the same reason that makes claim 16 allowable over the cited references, as well as for additional limitations presented.

#### Claims 24-25

Claims 24-25 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Vaughan, and in further view of Grylls. Claim 25 depend from claim 24. Claim 24, as amended, recites:

24. A continuous surface preparation process for a metal material comprising:
- grit blasting the metal material with a mixture of fine particles of aluminum oxide in air and water, wherein the grit has a mesh size of about 180-320;
  - rinsing the metal material with water to remove the grit;
  - subjecting the metal material to a caustic solution of sodium hydroxide;
  - rinsing the metal material with water to remove the caustic solution of sodium hydroxide;
  - applying a sol-gel coating to the metal material;
  - evaporating the water portion of the sol-gel coating;
  - applying a liquid adhesive coating to the sol-gel coating on the metal material wherein the liquid adhesive coating is an epoxy-based adhesive coating including:
    - an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and
    - a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotatate; and
  - evaporating the solvent portion of the adhesive coating.

Applicants traverse the rejections. Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 4 under 35 U.S.C. §103(a) by analogy, and assert that Blohowiak does not teach, disclose, or fairly suggest, as recited in claim 24, “applying a liquid adhesive coating to the sol-gel coating on the metal material,” wherein the liquid adhesive includes:

an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and

a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octoate.

Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Vaughan and Grylls. The cited reference to Vaughan teaches a method of weld-bonding that includes grit blasting a titanium alloy with 50 micron alumina. (4:34-38). Similarly, the cited reference Grylls teaches a method for producing a turbine airfoil that is coated with NiAl that involves grit blasting the NiAl coating using alumina particles mixed with compressed air and water vapor. (Paragraph 20).

Therefore, each of the cited references (Blohowiak, Vaughan and Grylls), whether individually or in combination, does not teach every aspect of claim 24. As a result, claim 24 is allowable. Further, because claim 25 depends from claim 24, claim 25 is at least allowable due to the same reason that claim 24 is allowable, as well as due to additional limitations recited.

#### Claims 26-34

Claims 26-34 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Konieczny. Claims 26-34 depend from claim 24. Applicants traverse the rejections. Accordingly, applicants respectfully incorporate the argument presented above in response to the rejection of claim 24.

Moreover, the deficiencies of Blohowiak are also not remedied by Konieczny. The cited reference to Konieczny teaches that grit blasting may be used to create a roughed surface. (1:16-24). However, cited reference to Konieczny does not teach “applying a liquid adhesive coating to *the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 24. (emphasis added).

Therefore, claim 24 is allowable over the cited references (Blohowiak, Grylls, Vaughan, and Konieczny). Furthermore, since claims 26-34 depend from claim 24, they are at least allowable for the same reason that makes claim 24 allowable over the cited references, as well as for additional limitations recited in those claims.

#### Claims 37-38

Claims 37-38 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan, Konieczny, and Montano. Claims 37-38 depend from claim 24. Applicants traverse the rejections. Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 24 under 35 U.S.C. §103(a).

Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Montano. The cited reference to Montano teaches that an epoxy resin composition can be applied to a metal by spray coating, dip coating, and roller coating. (9:41-46). However, cited reference to Montano does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 24. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Grylls, Vaughan, Konieczny, and Montano) whether individually or in combination, does not disclose, teach the process recited in claim 24. Therefore, applicants respectfully that claims 37-38 are allowable at least due to their dependency on claim 24, as well as due to additional limitations recited in each claim.

#### Claims 39-40

Claims 39-40 are rejected under 35 U.S.C §103(a) as being unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Tola. Claims 39-40 depend from claim 24.

Applicants traverse the rejections. Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 24.

Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Tola. The cited reference to Tola teaches a method for forming a foil/dielectric laminate by applying an epoxy resin to the foil. (3:44-48). However, cited reference to Tola does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 24. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Grylls, Vaughan, Konieczny, and Tola) whether individually or in combination, does not disclose, teach the process recited in claim 24. Moreover, applicants respectfully assert that claims 39-40 are allowable at least due to their dependency on claim 24, as well as due to additional limitations in each claim.

#### Claim 42

Claim 42 is rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls and in further view of Vaughan, Konieczny, Shimizu, and Poutasse. Claim 42 depends from claim 24. Applicants traverse the rejections.

Specifically, applicants respectfully incorporate the argument presented above in response to the rejection of claim 4. Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Grylls, Vaughan, Konieczny, and Poutasse. The cited reference to Grylls teaches a method for producing a turbine airfoil that is coated with NiAl that involves grit blasting the NiAl coating using alumina particles mixed with compressed air and water vapor. (Paragraph 20). The cited reference to Konieczny teaches that grit blasting may be used to create a roughed surface. (1:16-24). The cited reference to Vaughan teaches a method of weld-bonding that includes grit blasting a titanium alloy with 50 micron alumina. (4:34-38). The cited reference to Poutasse teaches applying an epoxy adhesive containing acetone to a foil to produce a

laminate. (4:48-59). However, each of the cited references does not teach “applying a liquid adhesive coating *to the sol-gel coating* on the metal material,” and the epoxy-based adhesive coating, as recited in claim 24. (emphasis added).

Accordingly, applicants respectfully submit that each of the cited reference (Blohowiak, Grylls, Vaughan, Konieczny, Shimizu, and Poutasse) whether individually or in combination, does not disclose, teach the process recited in claim 24. Therefore, applicants respectfully assert that claim 42 is allowable at least due to its dependency on claim 24, as well as due to additional limitations recited in the claim.

#### Claims 43-44

Claims 43-44 are rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan, and Shimizu. Claim 44 depend from claim 43. Claim 43 recites:

43. A continuous surface preparation process for a metal material, said process comprising:
  - grit blasting the metal material with a mixture of fine particles of aluminum oxide in air and water, wherein the grit has a mesh size of about 180-320;
  - rinsing the metal material with water to remove the grit;
  - subjecting the metal material to a caustic solution of sodium hydroxide wherein the caustic solution of sodium hydroxide has a concentration of about 10-50% by weight sodium hydroxide;
  - rinsing the metal material with water to remove the caustic solution of sodium hydroxide from the metal material;
  - applying a sol-gel coating to the metal material wherein the sol-gel is a mixture of a zirconium alkoxide, 3-glycidoxypropyltrimethoxysilane, glacial acetic acid, and a surfactant;
  - evaporating the water portion of the sol-gel coating;
  - applying a liquid adhesive coating to the sol-gel coating on the metal material wherein the liquid adhesive coating is an epoxy-based adhesive coating including:

an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and  
a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotatate; and  
evaporating the solvent portion of the adhesive coating.

Applicants respectfully submit that each of the cited references (Blohowiak, Grylls, Vaughan, and Shimizu), does not teach the process as recited in claim 43.

Specifically, applicants hereby respectfully incorporate the argument presented above in response to the rejection of claim 4 under 35 U.S.C. §103(a) by analogy, and assert that each of the cited references to Blohowiak and Shimizu does not teach, disclose, or fairly suggest, as recited in claim 43, "applying a liquid adhesive coating to the sol-gel coating on the metal material," wherein the liquid adhesive includes:

an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and

a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotatate.

Moreover, the deficiencies of Blohowiak are also not remedied by the teachings of Vaughan and Grylls. The cited reference to Grylls teaches a method for producing a turbine airfoil that is coated with NiAl that involves grit blasting the NiAl coating using alumina particles mixed with compressed air and water vapor. (Paragraph 20). The cited reference to Vaughan teaches a method of weld-bonding that includes grit blasting a titanium alloy with 50 micron alumina. (4:34-38).

For these reasons, applicants respectfully submit that claim 43 is allowable over the reference cited to Blohowiak, Grylls, Vaughan, and Shimizu. Furthermore, because claim 44 depends from claim 43, it is also allowable over the references cited at least due to its dependency on claim 43, as well as for additional limitations recited.

#### Claim 45

Claim 45 is rejected under 35 U.S.C. §103(a) as unpatentable over Blohowiak in view of Grylls, and in further view of Vaughan and Shimizu. Claim 45 recites:

45. A continuous surface preparation process for titanium foil material, said process comprising:
- grit blasting the titanium foil with a mixture of fine particles of aluminum oxide in air
  - and water, wherein the grit has a mesh size of about 280;
  - rinsing the foil with water to remove the grit from the foil;
  - subjecting the foil material to a caustic solution of sodium hydroxide wherein the caustic solution of sodium hydroxide has a concentration of about 25% by weight sodium hydroxide;
  - rinsing the foil with water to remove the caustic solution of sodium hydroxide from the foil;
  - applying a sol-gel coating to the foil wherein the sol-gel is a mixture of a zirconium n-propoxide 3-glycidoxypropyltrimethoxysilane, glacial acetic acid, and a surfactant;
  - evaporating the water portion of the sol-gel coating;
  - applying a liquid adhesive coating to the sol-gel coating on the foil wherein the liquid adhesive coating is an epoxy-based adhesive coating including:
    - an epoxy material comprising about 3-35% by wt. liquid diglycidylether of bisphenol-A, about 35-60% by wt. solid diglycidylether of bisphenol-A, about 10-30% by wt. novolac-epoxy, and about 5-18% by wt. carboxy-terminated acrylonitrile-butadiene rubber; and a second curative material comprising about 0-100% by wt. 4,4'-diaminodiphenylsulfone, about 0-100% by wt. 3,3'-diaminodiphenylsulfone, and about 0-0.2% by wt. chromium octotatate; and



evaporating the solvent portion of the adhesive coating.

Applicants respectfully submit that each of the cited references (Blohowiak, Grylls, Vaughan, and Shimizu), does not teach the process recited in claim 45. Specifically, applicants hereby respectfully incorporate the arguments presented above in response to the rejection of claim 43 under 35 U.S.C. §103(a) by analogy, and submit that claim 45 is allowable over the reference cited to Blohowiak, Grylls, Vaughan, and Shimizu.

#### Claims 63-70

Claims 63-70 are newly added. Claims 63-66 depend from and apply additional limitations to claim 43. Claims 67-70 depend from and apply additional limitations to claim 45. Accordingly, claims 63-66 and 67-70 are allowable for at least the same reasons that make claim 43 and claim 45 respectively allowable, as well for additional limitations recited in each claim.

## CONCLUSION

Applicants respectfully submit that pending claims 4-13, 16-21, 23-34, 37-40, 42-45, and 61-70 are now in condition for allowance. If there are any remaining matters that may be handled by telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

Respectfully Submitted,

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